

Programmable Controller Analog Terminal Block
Conversion Module

Programmable Controller High-Speed Counter
Module Terminal Block Conversion Module

FA Goods

Model

FA-LTB40ADG

FA-LTB40DAG

FA-TB20TD

FA-LTB40ADGN

FA-LTB40TDG

FA-TB20TC

FA-LTB40ADDG

FA-LTB40RD3G

FA-LTB40D63P6V5

FA-LTB40D63P6V12

FA-LTB40D63P6V24

User's Manual

 **MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED**

● SAFETY PRECAUTIONS ●

(Always read these precautions prior to use.)

Before using this product, please read this manual carefully and pay full attention to safety to ensure that the product is used correctly.

The precautions presented in this manual are concerned with this product only. For programmable controller system safety precautions, refer to the user's manual of the programmable controller to be used. In this manual, the ● SAFETY PRECAUTIONS ● are ranked as "DANGER" and "CAUTION".




DANGER

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



CAUTION

Indicates that incorrect handling may cause hazardous conditions, resulting in medium or minor injury and/or property damage.

Note that failure to observe the  CAUTION level instructions may lead to a serious consequence according to the circumstances. Always follow the precautions of both levels because they are important to personal safety.

Please keep this manual in an easy-to-access location for future reference, and be sure to provide the manual to the end user.

[Installation Precautions]

CAUTION

- Use this module in an environment that complies with the general specifications described in the catalog. Use in an environment outside the scope of general specifications may result in risk of electric shock, fire, malfunction, product damage, and deterioration.
- During installation, be sure to fully secure the module using a DIN rail or mounting screws and fully tighten the screws to the specified torque. Loosely tightened screws results in the risk of the module dropping and malfunction.
- Be careful to prevent foreign matter such as dust or wiring chips from entering the module. Failure to do so may result in the risk of fire, failure, and malfunction.
- Do not touch a powered terminal. Doing so results in the risk of malfunction.
- Do not directly touch a powered section of the module. Doing so results in the risk of module failure and malfunction.

[Wiring Precautions]

DANGER

- Be sure to shut off all phases of the external power supply used by the system before installation or wiring work. Failure to do so results in the risk of electric shock, module failure, and malfunction.

CAUTION

- Be sure to ground the FG terminal by applying class D grounding (class 3 grounding) or higher. Failure to do so results in the risk of electric shock and malfunction.
- Correctly wire cables to the module after checking the rated voltage and terminal layout of the product. Connecting a power supply having a different rating or wiring the module incorrectly results in the risk of fire and malfunction.
- When wiring the input signal line and output signal line, do not bind the line with or have the line contact wiring having superimposed noise. Doing so results in the risk of malfunction.
- Tighten the terminal screws within the range of the specified torque. If a screw is too loose, a short circuit, or malfunction may result. If a screw is too tight, screw and/or module damage may result, causing the module to drop, a short circuit, or malfunction.

[Startup and Maintenance Precautions]



DANGER

- Do not touch a terminal while the module is powered. Doing so results in the risk of electric shock and malfunction.
- Be sure to turn the power OFF before cleaning the module or retightening terminal screws. Failure to do so results in the risk of module failure and malfunction.



CAUTION

- Do not disassemble or modify the module. Doing so results in the risk of failure, malfunction, injury, and fire.
- Be sure to shut off all phases of the external power supply module installation or removal. Failure to do so results in the risk of electric shock, module failure, and malfunction.

[Disposal Precautions]



DANGER

- At the time of disposal, treat the product as industrial waste.

INTRODUCTION

Thank you for purchasing the FA Goods programmable controller analog terminal block conversion module and programmable controller high-speed counter module terminal block conversion module. Before using the product, please read this manual carefully to ensure correct and effective use.

1. PERFORMANCE SPECIFICATIONS

FA-LTB40TDG

Model name		Thermocouple input terminal block conversion module
Item		FA-LTB40TDG
Connectable module (Note 1)		Q68TD-G-H01, Q68TD-G-H02
Connectable cable (Note 2)		FA-CBL**Q68TDG
Terminal block (regular screws)		Applicable wire: 0.5 to 1.25mm ² (conform to JIS C 2811) However, a 0.3 to 2mm ² cable is connectable by using an applicable crimping terminal.
		Operating voltage: 8VDC or less, operating current: 1mA or less
		Terminal screw tightening torque range: 50 to 75N·cm (5.2 to 7.6kgf·cm)
		Terminal block screw: M3 screw
Module mounting	Mounting screws	M4 (with plain washer) x 0.7mm x 8mm or greater Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm)
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (conform to JIS C 2812)
Dielectric withstand voltage		Between analog input CHs: 1000VAC for 1 minute; Other: 500VAC for 1 minute
Insulation resistance (initial)		10MΩ or more by 500VDC insulation resistance tester
Weight		About 200g

Note 1: Applies to the programmable controller MELSEC-Q series manufactured by Mitsubishi Electric Corporation.

Note 2: The two asterisks (**) indicate cable length (05: 0.5m, 10: 1m, 20: 2m, 30: 3m).

FA-TB20TD

Model name		Thermocouple input terminal block conversion module
Item		FA-TB20TD
Connectable module (Note 1)		Q64TD、Q64TDV-GH A1S68TD
Connectable cable (Note 2)		FA-CBLQ64TD** FA-CBLS68TD**
Terminal block (Captive screws)		Applicable wire: 0.5 to 1.25mm ² (conform to JIS C 2811) However, a 0.3 to 2mm ² cable is connectable by using an applicable crimping terminal.
		Operating voltage: 5VDC or less operating current: 1mA or less
		Terminal block screw: M3 screw
		Terminal screw tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm)
		Terminal block screw pull force (axial direction): 78.4N or greater
Module mounting	Mounting screws	M4 x 0.7mm x 22mm or greater, tightening torque range: 78 to 118N·cm (8 to 12kgf·cm)
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (conform to JIS C 2812)
Dielectric withstand voltage		1500VAC (50/60Hz) for 1 minute
Insulation resistance (initial)		100MΩ or more by 500VDC insulation resistance tester
Weight		125g

Note 1: Applies to the programmable controller MELSEC-Q series and AnS series manufactured by Mitsubishi Electric Corporation.

Note 2: The two asterisks (**) indicate cable length (05: 0.5m, 10: 1m, 15: 1.5m, 20: 2m, 25: 2.5m, 30: 3m).

FA-TB20TC

Model name		Temperature control terminal block conversion module
Item		FA-TB20TC
Connectable module (Note 1)		Q64TCTT, Q64TCTTBW A1S64TCTRT, A1S64TCTRTBW
Connectable cable (Note 2)		FA-CBLQ64TC** FA-CBLS64TCTR**
Terminal block (Captive screws)		Applicable wire: 0.5 to 1.25mm ² (conform to JIS C 2811) However, a 0.3 to 2mm ² cable is connectable by using an applicable crimping terminal.
		Operating voltage: 30VDC or less; Operating current: 400mA or less (common), 100mA or less (signal)
		Terminal block screw: M3 screw
		Terminal screw tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm)
		Terminal block screw pull force (axial direction): 78.4N or greater
Module mounting	Mounting screws	M4 x 0.7mm x 22mm or greater, tightening torque range: 78 to 118N·cm (8 to 12kgf·cm)
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (conform to JIS C 2812)
Dielectric withstand voltage		1500VAC (50/60Hz) for 1 minute
Insulation resistance (initial)		100MΩ or more by 500VDC insulation resistance tester
Weight		125g

Note 1: Applies to the programmable controller MELSEC-Q series and AnS series manufactured by Mitsubishi Electric Corporation.

Note 2: The two asterisks (**) indicate cable length (05: 0.5m, 10: 1m, 15: 1.5m, 20: 2m, 25:2.5m, 30: 3m).

FA-LTB40RD3G

Model name		RTD input terminal block conversion module
Item		FA-LTB40RD3G
Connectable module (Note 1)		Q68RD3-G
Connectable cable (Note 2)		FA-CBL**Q68RD3G
Terminal block (Regular screws)		Applicable wire: 0.5 to 1.25mm ² (conform to JIS C 2811) However, a 0.3 to 2mm ² cable is connectable by using an applicable crimping terminal.
		Operating voltage: 8VDC or less, operating current: 1mA or less
		Terminal screw tightening torque range: 50 to 75N·cm (5.2 to 7.6kgf·cm)
		Terminal block screw: M3 screw
Module mounting	Mounting screws	M4 (with plain washer) x 0.7mm x 8mm or greater Tightening torque range: 78 to 118N·cm (8 to 12kgf·m)
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (conform to JIS C 2812)
Dielectric withstand voltage		Between analog input CHs: 1000VAC for 1 minute, Other: 500VAC for 1 minute
Insulation resistance (initial)		10MΩ or more by 500VDC insulation resistance tester
Weight		About 200g

Note 1: Applies to the programmable controller MELSEC-Q series manufactured by Mitsubishi Electric Corporation.

Note 2: The two asterisks (**) indicate cable length (05: 0.5m, 10: 1m, 20: 2m, 30: 3m).

FA-LTB40ADG, FA-LTB40ADGN, FA-LTB40ADDG, FA-LTB40DAG

Model name Item		Q68AD-G conversion module		Q66AD-DG conversion module	Q66DA-G conversion module
		FA-LTB40ADG	FA-LTB40ADGN	FA-LTB40ADDG	FA-LTB40DAG
Connectable module (Note 1)		Q68AD-G		Q66AD-DG	Q66DA-G
Connectable cable (Note 2)		FA-CBL**Q68ADG	FA-CBL**Q68ADGN	FA-CBL**Q66ADDG	FA-CBL**Q66DAG
Terminal block (Regular screws)		Applicable wire: 0.5 to 1.25mm ² (conform to JIS C 2811) However, a 0.3 to 2mm ² cable is connectable by using an applicable crimping terminal.			
		Terminal screw tightening torque range: 50 to 75N·cm (5.2 to 7.6kgf·cm)			
		Terminal block screw: M3 screw			
		Operating voltage	10VDC	10VDC	24VDC
		Operating current	30mA or less	30mA or less	360mA or less
Module mounting	Mounting screws	M4 (with plain washer) x 0.7mm x 8mm or greater Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm)			
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (conform to JIS C 2812)			
Connector		MIL40P			
Dielectric withstand voltage		Between CHs: 1000VAC for 1 minute, Other: 500VAC for 1 minute			
Insulation resistance (initial)		10MΩ or more by 500VDC insulation resistance tester			
Weight		About 200g			

Note 1: Applies to the programmable controller MELSEC-Q series manufactured by Mitsubishi Electric Corporation.

Note 2: The two asterisks (**) indicate cable length (05: 0.5m, 10: 1m, 20: 2m, 30: 3m).

FA-LTB40D63P6V5, FA-LTB40D63P6V12, FA-LTB40D63P6V24

Model name Item			QD63P6 terminal block conversion module		
			5V signal input	12V signal input	24V signal input
			FA-LTB40D63P6V5	FA-LTB40D63P6V12	FA-LTB40D63P6V24
Connectable module (Note 1)			QD63P6		
Connectable cable (Note 2)			FA-CBL**QD63P6		
Terminal block (Regular screws)			Applicable line: 0.5 to 1.25mm ² (conform to JIS C 2811) However, a 0.3 to 2mm ² cable is connectable by using an applicable crimping terminal.		
			Terminal screw tightening torque range: 50 to 75N·cm (5.2 to 7.6kgf·cm)		
			Terminal block screw: M3 screw		
			Counter input signal	Voltage	5V±10%
			Current	6.4 to 11.5mA	10.8 to 15.9mA
			Connectable encoder	Open collector output CMOS voltage output	Open collector output
Module mounting	Mounting screws	M4 (with plain washer) x 0.7mm x 8mm or greater Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm)			
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (conform to JIS C 2812)			
Dielectric withstand voltage			500VAC for 1 minute		
Insulation resistance (initial)			10MΩ or more by 500VDC insulation resistance tester		
Weight			About 200g		

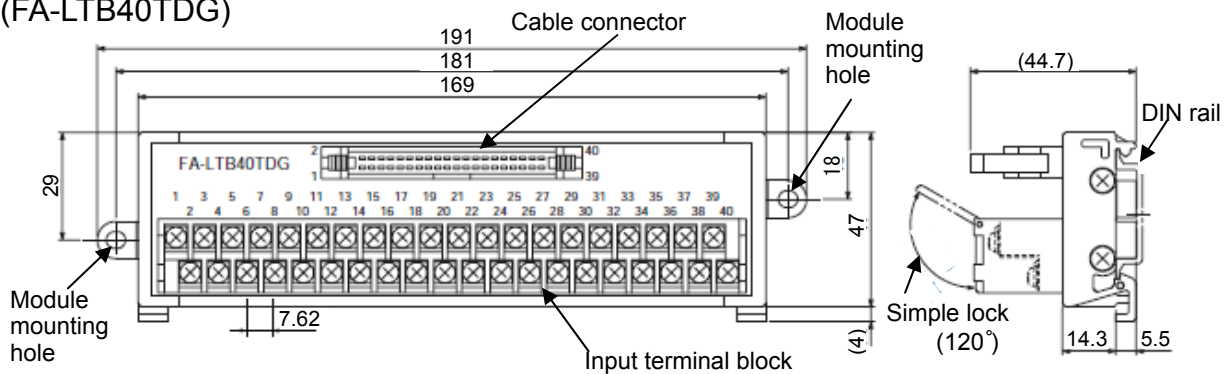
Note 1: Applies to the programmable controller MELSEC-Q series manufactured by Mitsubishi Electric Corporation.

Note 2: The two asterisks (**) indicate cable length (05: 0.5m, 10: 1m, 15: 1.5m, 20: 2m).

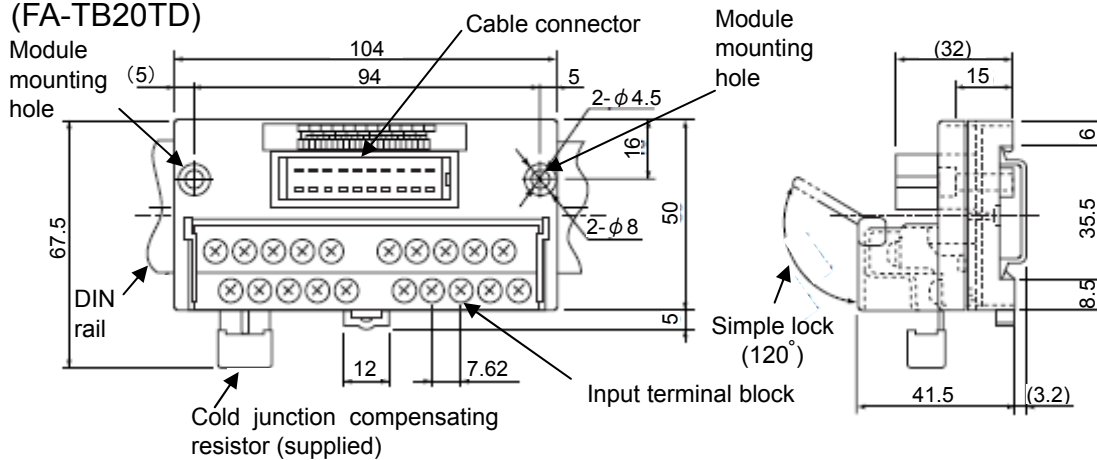
2. EXTERNAL DIMENSIONS

[unit: mm]

- Insulated thermocouple input terminal block conversion module
(FA-LTB40TDG)

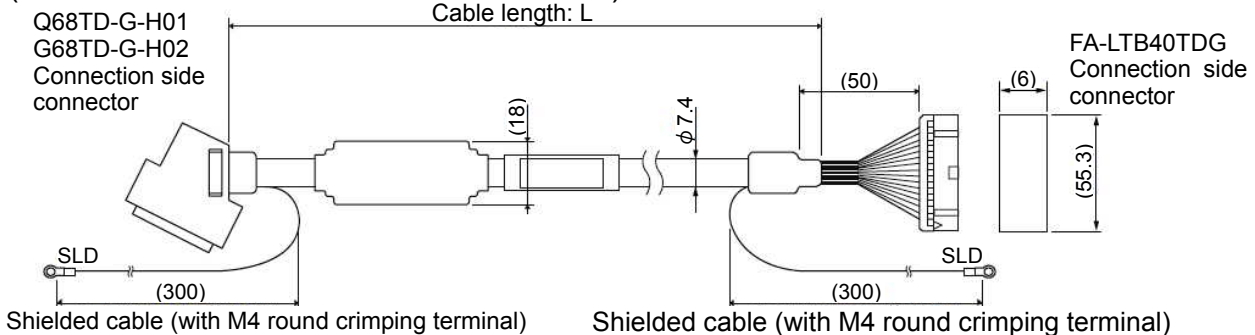


- Thermocouple input terminal block conversion module
(FA-TB20TD)

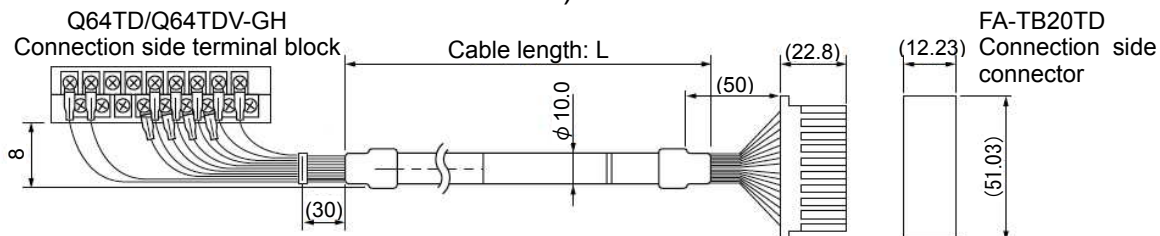


- Thermocouple input dedicated cable

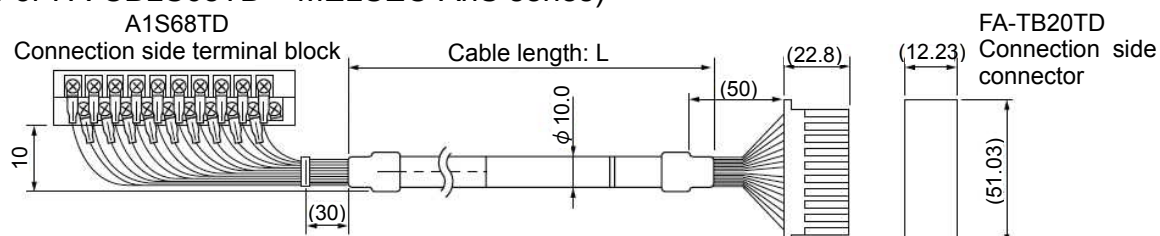
(For FA-CBL**Q68TDG MELSEC-Q series)



(For FA-CBLQ64TD** MELSEC-Q series)



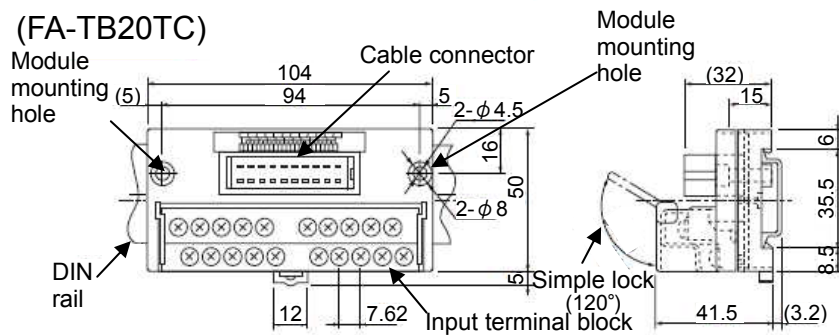
(For FA-CBLS68TD** MELSEC-AnS series)



- Temperature control terminal block conversion module

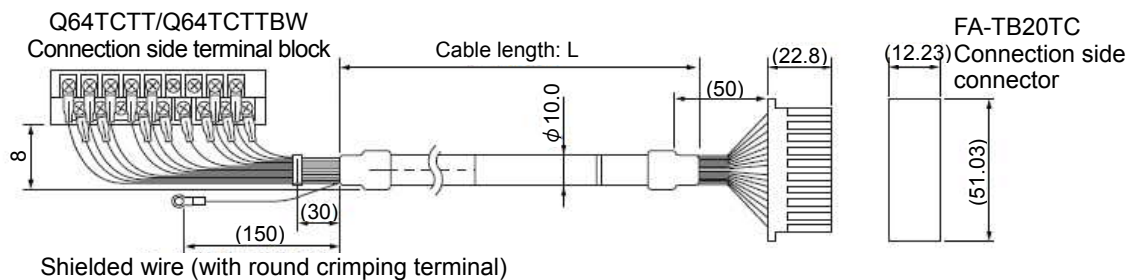
[Unit: mm]

(FA-TB20TC)

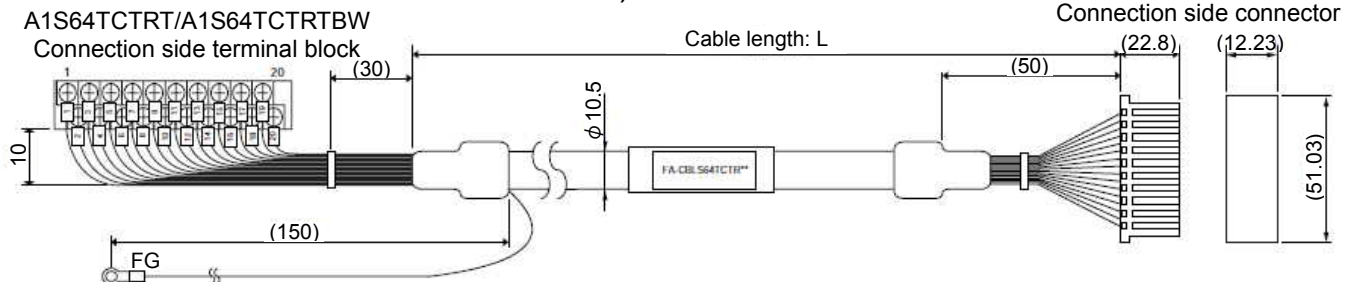


- Temperature control cable with terminal block

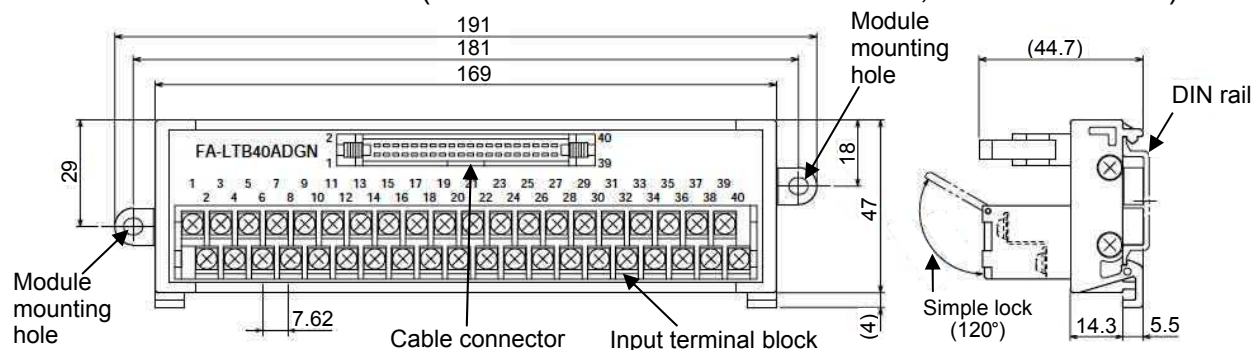
(For FA-CBLQ64TC** MELSEC-Q series)



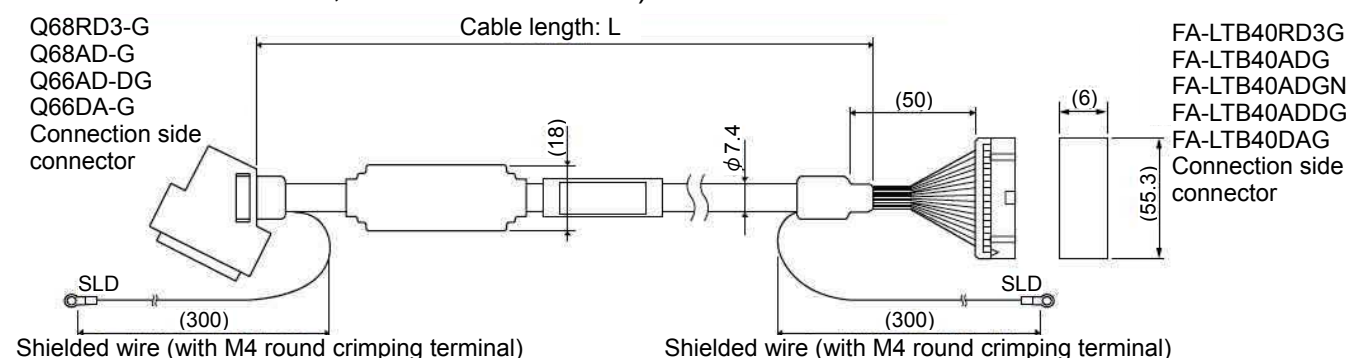
(For FA-CBLS64TCTR** MELSEC-AnS series)



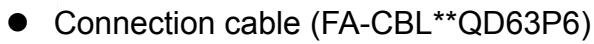
- Insulated analog module terminal block conversion module, insulated RTD input module terminal block conversion module (FA-LTB40ADG/ADGN/ADDG/DAG, FA-LTB40RD3G)



- Connection cable (FA-CBL**Q68ADG, FA-CBL**Q68ADGN, FA-CBL**Q66ADDG, FA-CBL**Q66DAG, FA-CBL**Q68RD3G)

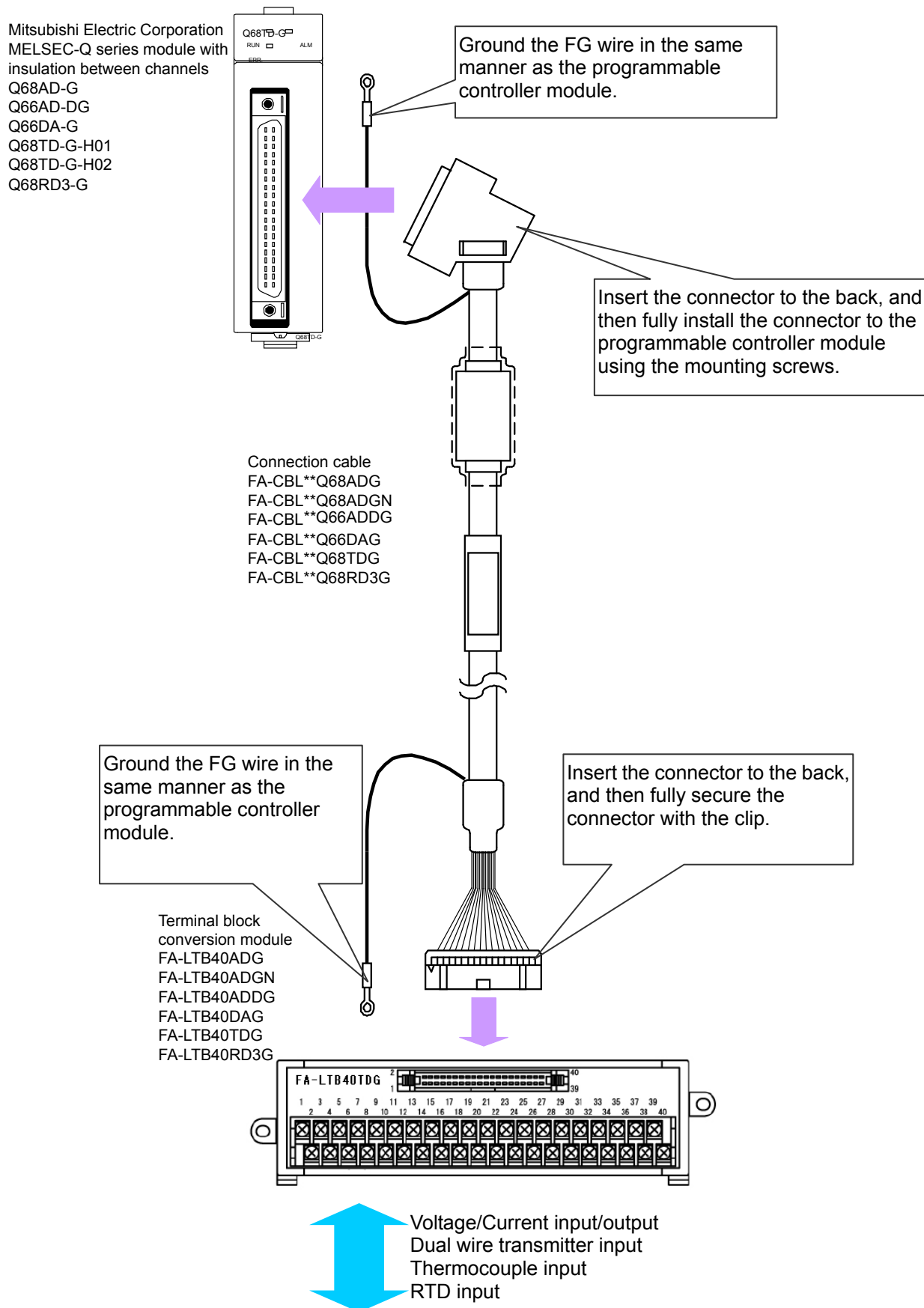


[Unit: mm]



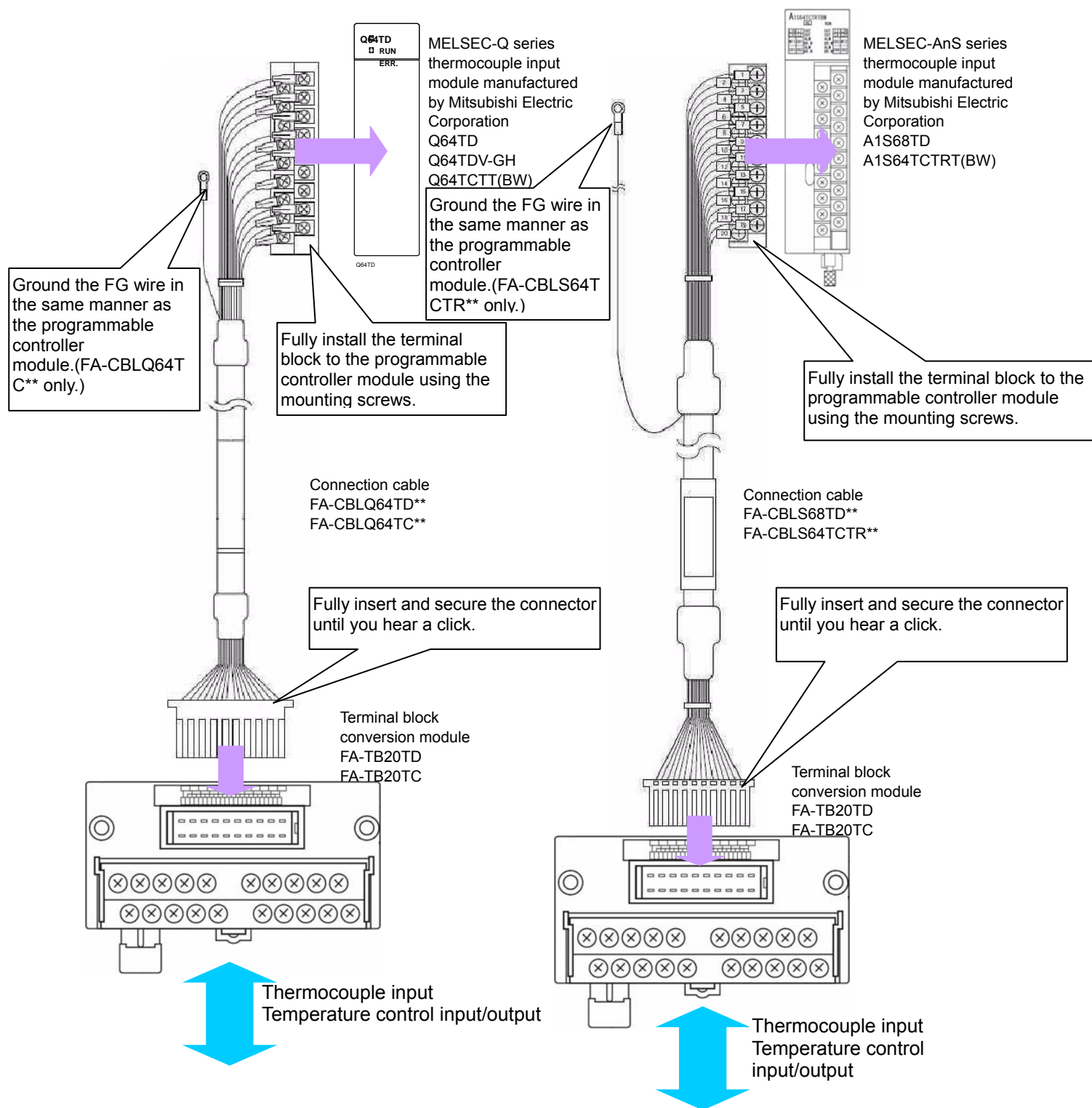
3. INSTALLATION METHOD

3-1 Connecting the Connection Cable and Terminal Block Conversion Module with MELSEC-Q Series For MELSEC-Q series module with insulation between channels (Q68AD-G, Q66AD-DG, Q66DA-G, Q68TD-G-H01, Q68TD-G-H02, Q68RD3-G)

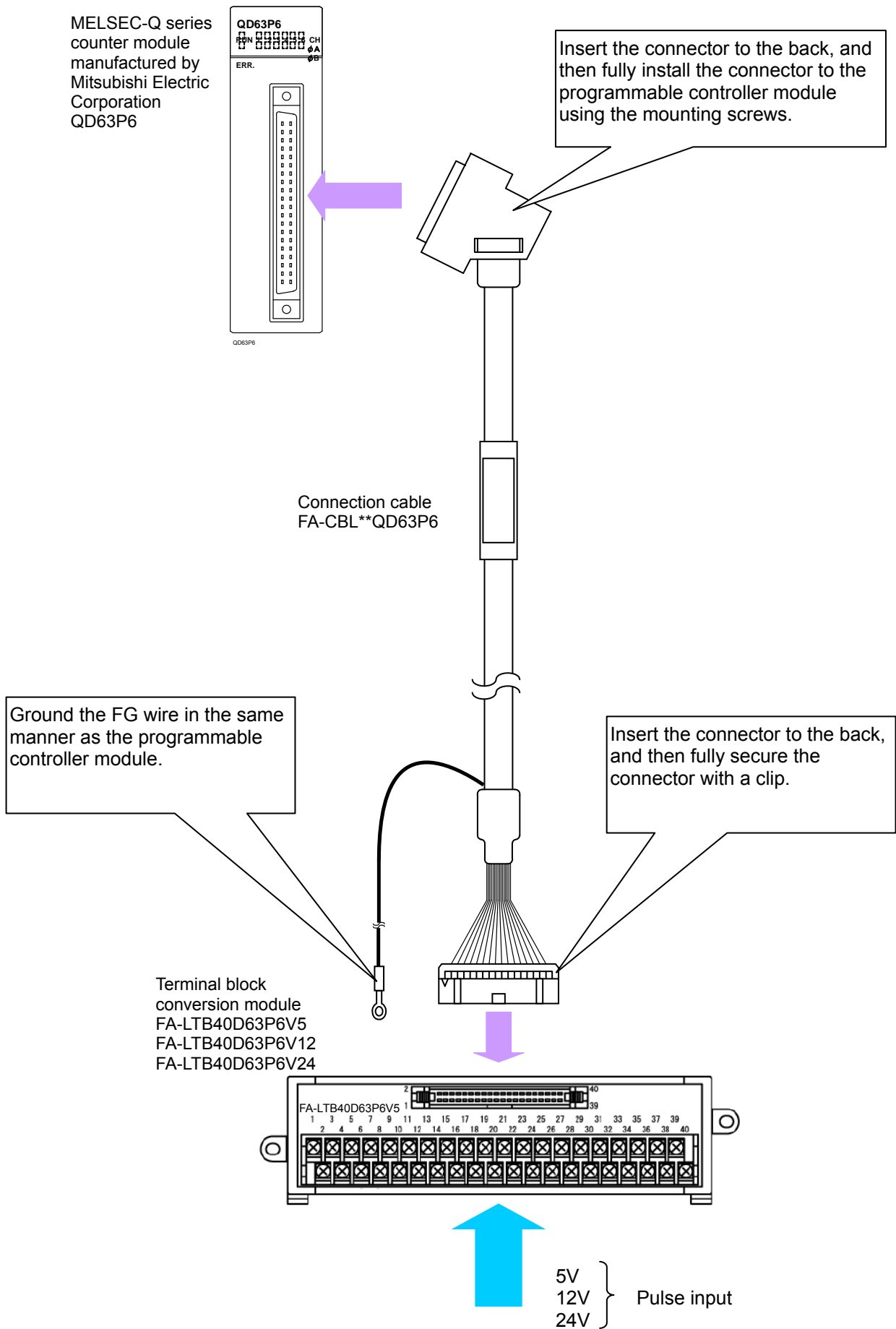


For MELSEC-Q series thermocouple input module
[Q64TD, Q64TDV-GH, Q64TCTT (BW)]

For MELSEC-AnS series thermocouple input module
[A1S68TD, A1S64TCTRT (BW)]



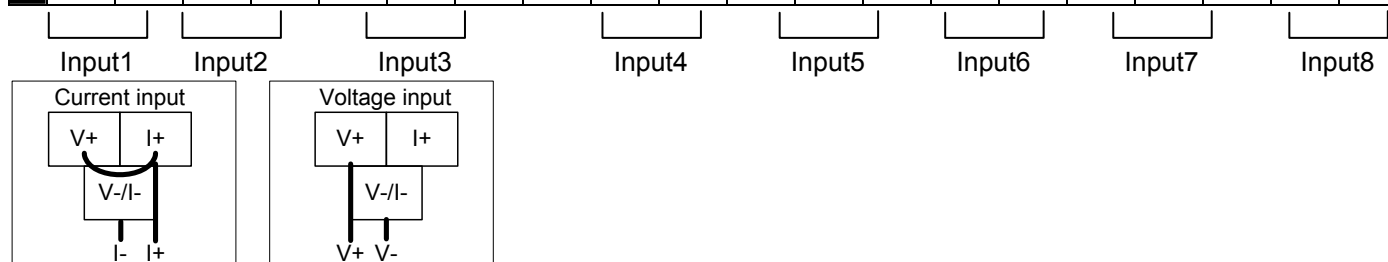
For MELSEC-Q series high-speed counter module (QD63P6)



3-2 Connecting the Terminal Block Conversion Module and External Devices

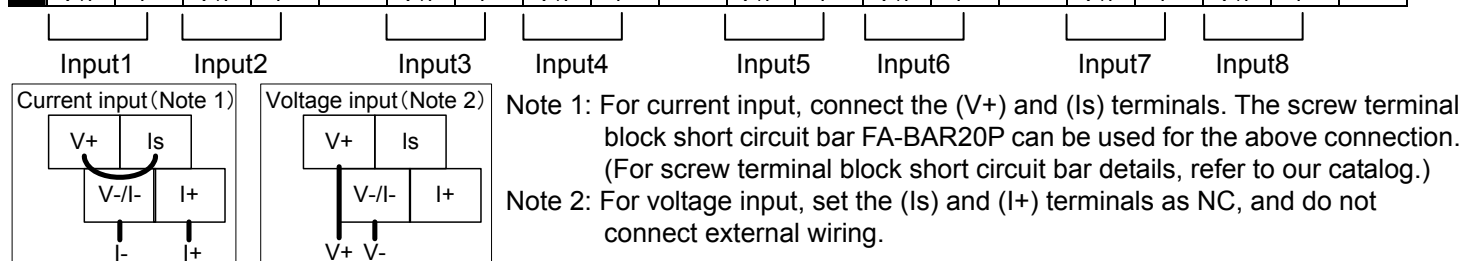
FA-LTB40ADG

1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	
CH1 V+	-	CH2 V+	CH2 V-/I-	-	CH3 V+	CH3 I+	-	-	CH4 V-/I-	-	CH5 V+	CH5 I+	-	CH6 V-/I-	-	CH7 V+	CH7 I+	-	CH8 V-/I-	
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	
CH1 V-/I-	CH1 I+	-	CH2 I+	-	CH3 V-/I-	-	-	CH4 V+	CH4 I+	-	CH5 V-/I-	-	CH6 V+	CH6 I+	-	CH7 V-/I-	-	CH8 V+	CH8 I+	



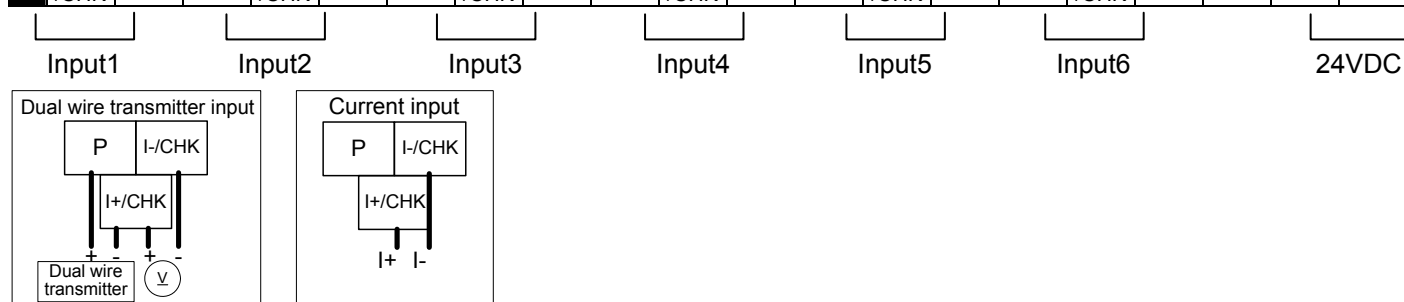
FA-LTB40ADGN

1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	
CH1 V+	CH1 Is	CH2 V+	CH2 Is	-	CH3 V+	CH3 Is	CH4 V+	CH4 Is	-	CH5 V+	CH5 Is	CH6 V+	CH6 Is	-	CH7 V+	CH7 Is	CH8 V+	CH8 Is	-	
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	
CH1 V-/I-	CH1 I+	CH2 V-/I-	CH2 I+	-	CH3 V-/I-	CH3 I+	CH4 V-/I-	CH4 I+	-	CH5 V-/I-	CH5 I+	CH6 V-/I-	CH6 I+	-	CH7 V-/I-	CH7 I+	CH8 V-/I-	CH8 I+	-	



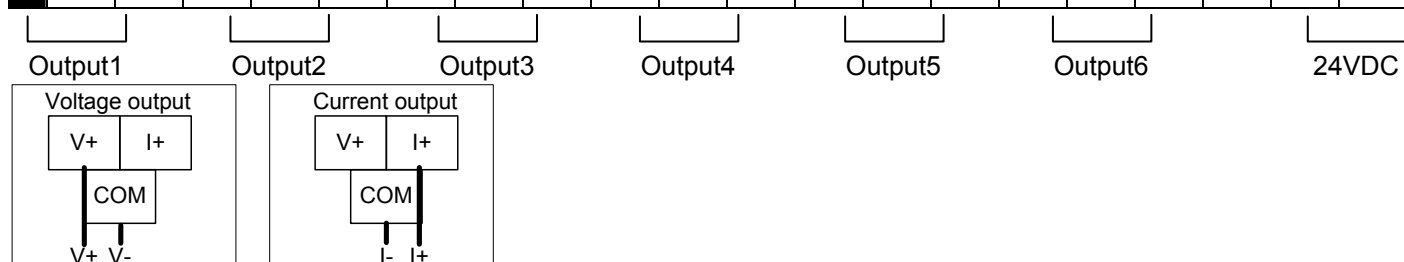
FA-LTB40ADDG

1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	
CH1 P	I-/CHK	-	CH2 P	I-/CHK	-	CH3 P	I-/CHK	-	CH4 P	I-/CHK	-	CH5 P	I-/CHK	-	CH6 P	I-/CHK	-	-	DC24V	
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	
I+/CHK	-	-	I+/CHK	-	-	I+/CHK	-	-	I+/CHK	-	-	I+/CHK	-	-	I+/CHK	-	-	-	DC24G	



FA-LTB40DAG

1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	
CH1 V+	CH1 I+	-	CH2 V+	CH2 I+	-	CH3 V+	CH3 I+	-	CH4 V+	CH4 I+	-	CH5 V+	CH5 I+	-	CH6 V+	CH6 I+	-	-	DC24V	
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	
COM1	-	-	COM2	-	-	COM3	-	-	COM4	-	-	COM5	-	-	COM6	-	-	-	DC24G	



FA-LTB40TDG

1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	
CH1	-	CH2	-	CH3	-	CH4	-	CH5	-	CH6	-	CH7	-	CH8	-	-	-	-	RTD	
+		+		+		+		+		+		+		+					G	

2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
CH1	-	CH2	-	CH3	-	CH4	-	CH5	-	CH6	-	CH7	-	CH8	-	-	-	RTD	RTD
-		-		-		-		-		-		-		-				+	-

Input1

Input2

Input3

Input4

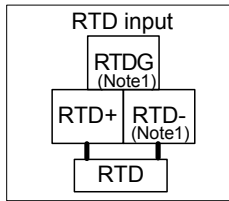
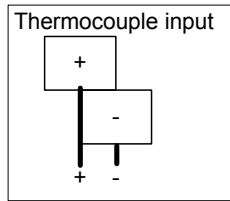
Input5

Input6

Input7

Input8

RTD



- Install the module in a location having a constant ambient temperature.
- Connect the thermocouple or compensation lead wire directly to the terminal block.

Note 1: For the cold junction compensating resistor (RTD), connect the supplied Q68TD-G-H01 and -H02 products to terminal numbers 38 and 40 as illustrated above. Terminal number 38 (RTD G) and terminal number 40 (RTD -) are connected inside the conversion module, and therefore do not require external wiring.

FA-LTB40RD3G

1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	
CH1	CH1	-	CH2	-	CH3	CH3	-	CH4	-	CH5	CH5	-	CH6	-	CH7	CH7	-	CH8	-	
A1	b1		B2		A3	b3		B4		A5	b5		B6		A7	b7		B8		

2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
CH1	-	CH2	CH2	-	CH3	-	CH4	CH4	-	CH5	-	CH6	CH6	-	CH7	-	CH8	CH8	-
B1		A2	b2		B3		A4	b4		B5		A6	b6		B7		A8	b8	

Input1

Input2

Input3

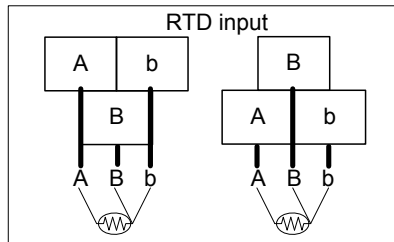
Input4

Input5

Input6

Input7

Input8



FA-TB20TD(With Q64TD and Q64TDV-GH connection)

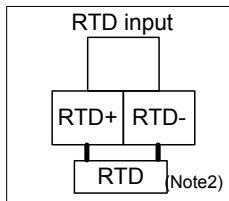
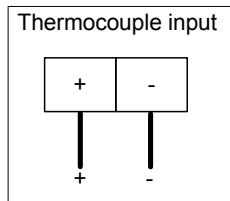
1	3	5	7	9	11	13	15	17	19	
-	-	-	SLD	CH2	CH2	CH4	CH4	SLD	-	
				+	+	+	+			

2	4	6	8	10	12	14	16	18	20
RTD	RTD	SLD	CH1	CH1	CH3	CH3	SLD	-	-
+	-		+	-	+	-			

RTD

Input1

Input3



- Install the module in a location having a constant ambient temperature.
 - Connect the thermocouple or compensation lead wire directly to the terminal block.
 - For FA-CBLQ64TD** and FA-CBLS68TD**, a ground wire is not wired. Grounding with FA-TB20TD is not possible.
- Ground Q64TD with terminal number 18 of the programmable controller module side terminal block of FA-CBLQ64TD.
- Ground A1S68TD with terminal number 20 of the programmable controller module side terminal block of FA-CBLS68TD**.

FA-TB20TC(With Q64TCTT(BW) connection)

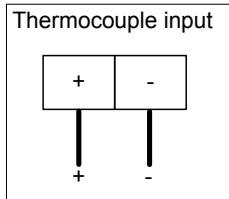
1	3	5	7	9	11	13	15	17	19	
L1	L3	COM	CH1	CH1	-	-	CH3	CH3	-	
			+	-			+	-		

2	4	6	8	10	12	14	16	18	20
L2	L4	-	CH2	CH2	-	-	CH4	CH4	-
			+	-			+	-	

Control output

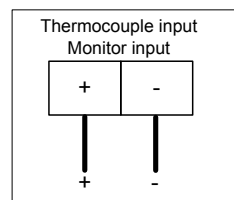
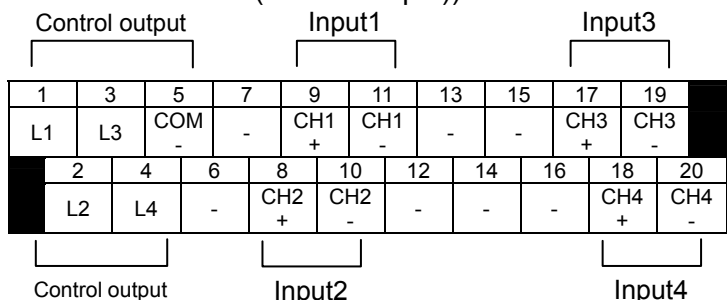
Input2

Input4



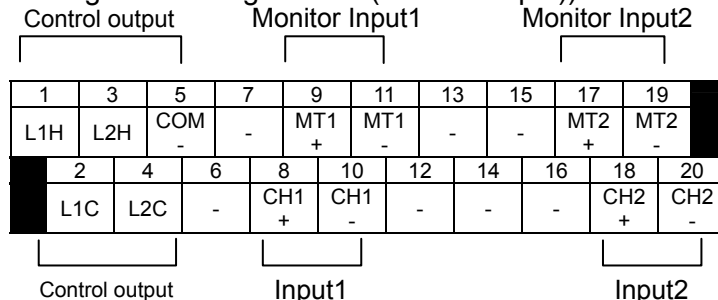
- Install the module in a location having a constant ambient temperature.
- Connect the thermocouple or compensation lead wire directly to the terminal block.
- The cold junction compensating resistor (RTD) is built into FA-TB20TC.

FA-TB20TC(With A1S64TCTRT(BW) connection
: Standard Control (thermocouple))

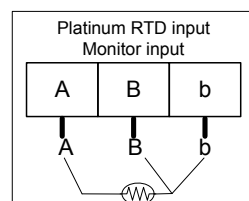
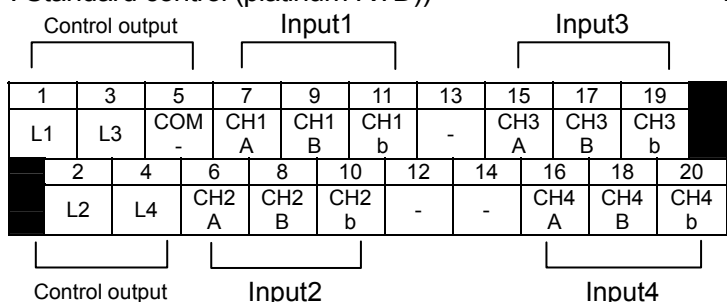


- Install the module in a location having a constant ambient temperature.
- Connect the thermocouple or compensation lead wire directly to the terminal block.
- The cold junction compensating resistor (RTD) is built into FA-TB20TC.

FA-TB20TC (with A1S64TCTRT (BW) connection
: Heating and cooling Control (thermocouple))

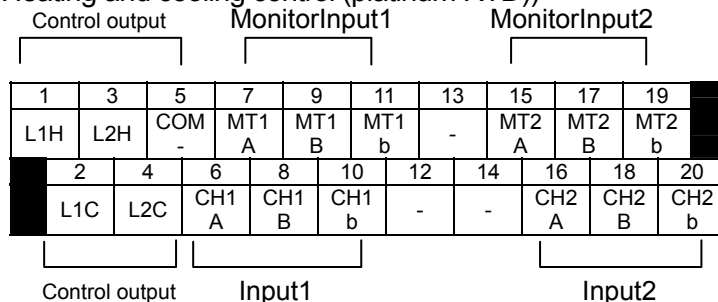


FA-TB20TC (With A1S64TCTRT (BW) connection
: Standard control (platinum RTD))

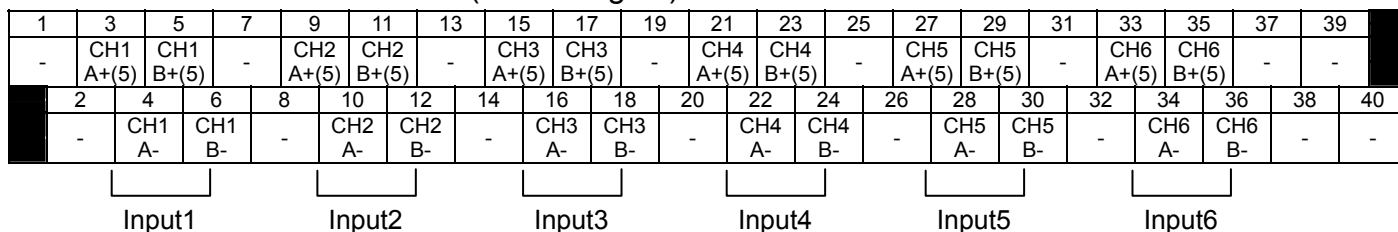


- Install the module in a location having a constant ambient temperature.
- Connect the thermocouple or compensation lead wire directly to the terminal block.
- The cold junction compensating resistor (RTD) is built into FA-TB20TC.

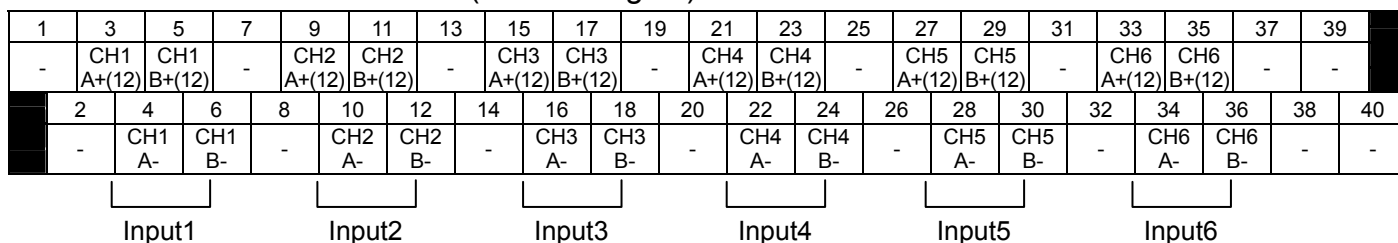
FA-TB20TC (With A1S64TCTRT (BW) connection
: Heating and cooling control (platinum RTD))



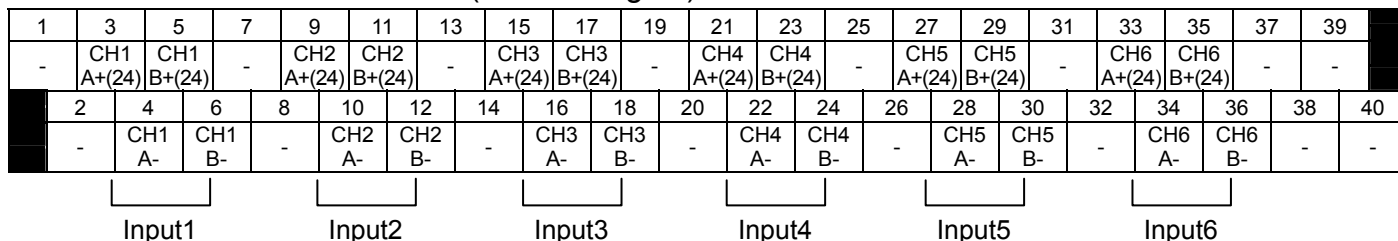
FA-LTB40D63P6V5 (For 5V signal)

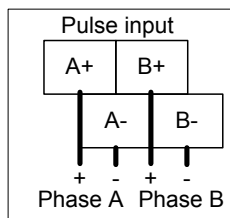


FA-LTB40D63P6V12 (For 12V signal)



FA-LTB40D63P6V24 (For 24V signal)





4. USAGE PRECAUTIONS

- (1) For wiring to the terminal block, refer to the manual of the programmable controller module to be connected, published by Mitsubishi Electric Corporation.
- (2) Ground the FG wire provided with the cable in the same manner as the programmable controller module. Note that rolling up extra wire without grounding the wire may cause the wire to function as an antenna, resulting in the risk of noise.

For Your Safety

- This product has been manufactured as a general-purpose product for general industry applications, etc. The product is not intended for use in devices or systems used under conditions in which human life could be greatly affected.
- When considering application of this product to special applications, such as nuclear power, electrical power, aerospace, medical, or manned transport devices or systems, contact our sales service desk.
- Although this product was manufactured under a strict quality management system, the product shall be systematically provided with backup and fail-safe functions when applied to equipment that may lead to a major accident or damage in the unlikely event any failure or defect should occur in the product.

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Nagoya office (PC Engineering Dept.) Phone: +81 (52) 723-8058 Fax: +82 (52) 723-8062



During product use, be sure to ensure safety in the unlikely event failure occurs. Mitsubishi Electric Engineering assumes no responsibility whatsoever for any secondary damage caused by the failure of this product.

50D-FB0035 (0906) MEE

Information such as specifications is subject to change without notice.

Developed June 2009